

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

HONEYWELL INTERNATIONAL INC.; and
HONEYWELL INTELLECTUAL
PROPERTIES INC.;

Plaintiffs,

v.

APPLE COMPUTER, INC., et al.

Defendants.

Civil Action No. 04-1338 JJF
(Consolidated)

PUBLIC VERSION

**DEFENDANTS OPTREX'S, FUJIFILM'S AND SAMSUNG SDI'S OPENING
MEMORANDUM OF LAW IN SUPPORT OF THEIR
PROPOSED CLAIM CONSTRUCTION**

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FUJIFILM Corporation, FUJIFILM USA, Inc. (collectively, “Fuji”), Optrex America Inc. (“Optrex”), Samsung SDI Co., Ltd., and Samsung SDI America, Inc. (collectively, “Samsung SDI”), (collectively, “Defendants”) submit this memorandum in support of their proposed constructions of the disputed claim terms of U.S. Patent No. 5,280,371 (the “371 patent”).¹ Also submitted is a Declaration of Elliott Schlam (submitted under seal) and a Declaration of Alexander E. Gasser (submitted under seal).

I. NATURE AND STAGE OF THE PROCEEDINGS

Plaintiffs Honeywell International Inc. and Honeywell Intellectual Properties Inc. (collectively, “Plaintiffs” or “Honeywell”) filed this lawsuit in October 2004, alleging infringement of a single claim (claim 3) of the ‘371 patent, which is entitled “Directional Diffuser for a Liquid Crystal Display.” The defendants included manufacturers of liquid crystal display (“LCD”) modules (“Manufacturer Defendants”) and customers who incorporated LCD modules into products, such as cellular telephones and digital still cameras (“Customer Defendants”). Pursuant to Judge Jordan’s Order dated October 7, 2006, the action was stayed as to the Customer Defendants, and the case proceeded against the Manufacturer Defendants. D.I. 237. Honeywell and the Manufacturer Defendants have completed fact discovery, submitted expert reports on validity and unenforceability, and completed expert depositions. This Court modified the Scheduling Order only by setting the Markman briefing and hearing before dispositive motions. Oral Order dated March 28, 2008.

The parties filed a Joint Claim Construction Statement on March 24, 2008 setting forth the disputed terms of claim 3 of the 371 patent (the only asserted claim). D.I. 991.

II. SUMMARY OF ARGUMENT

Defendants’ claim construction relies solely on intrinsic evidence – the claim language, specification, and prosecution file history – in accordance with the Federal Circuit’s and this

¹ Ex. 1. Exhibits identified as “Ex. ____” are attached to Mr. Gasser’s declaration and exhibits identified as “Schlam Dec., Ex. ____” are attached to the Schlam Declaration.

Court's precedent. In contrast, Plaintiffs, motivated by the need to capture diverse product designs and establish an early date of invention in an attempt to preserve the patent's validity, advance unsupportably broad constructions divorced from the intrinsic evidence.

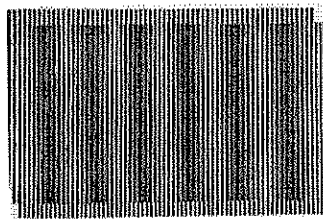
Defendants' construction of claim 3 requires (1) a distributed source of light separate from the lens arrays; (2) two lens arrays with lenslets extending horizontally, facing in the direction of the liquid crystal panel and having different pitches to produce a predetermined variation of light transmission with vertical viewing angle; (3) at least one of the lens arrays being rotated relative to the horizontal axis by no less than 2 degrees and no more than 16 degrees; and (4) a defined air gap between the light source and the lens arrays.

III. TECHNOLOGY BACKGROUND

The field to which the '371 patent is directed is backlit liquid crystal display ("LCD") devices where a lamp and a diffuser are placed behind the LCD panel to illuminate the LCD so that the image can be seen. *See* Ex. 1, Fig. 1, col. 2, lines 46-56. The '371 patent sought to introduce LCD displays into airplane cockpits. *See* Ex. 1, col. 1, lines 33-39. In cockpits a large vertical viewing angle is not necessary because the pilot's eye height is largely fixed. However, a wide horizontal viewing angle is important for cross-cockpit viewing so that the pilot and co-pilot can observe each other's instruments. *See* Ex. 1, col. 4, lines 52-58; Schlam Dec., ¶ 8.

A liquid crystal panel consists of two sheets of glass that have liquid crystal material dispersed between them, in a series of discrete, individually controllable pixels, which either allow light to pass through or block light, thereby forming an image. The electronic signals controlling the operation of each pixel are carried by conductors that typically extend from the edges of the liquid crystal panel between and along each row (and to some degree, columns) of pixels. The spacing between the rows is typically significantly wider and more pronounced than the spacing between the columns and both are typically blackened to enhance the display's contrast and hide the conductors. The net result is a periodic pattern of predominant black lines that run horizontally across the panel. Schlam Dec., Ex. 3, ¶ 10.

It had been recognized prior to the '371 patent that the use of lens arrays in combination with the backlight and diffuser could brighten the LCD display. Schlam Dec., ¶¶ 11, 12, 15. It had also been recognized that the use of lens arrays with LCDs caused moiré. See Ex. 2; Schlam Dec., ¶ 17. Moiré interference is an interference pattern created when two periodic structures with slightly differing frequencies are overlaid one on another such that visible defects in the form of light and dark lines or bands are formed as shown in the following illustration from a 1963 Scientific American article (Schlam Dec., ¶¶ 16, 17):



IV. STATEMENT OF FACTS

Claim 3 recites:

3. A display apparatus comprising:
 - a light source;
 - a liquid crystal panel mounted adjacent to said light source for receiving light from said light source; and
 - first and second lens arrays, each having a plurality of individual lenslets, disposed between said light source and said liquid crystal panel for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel, between said light source and said liquid crystal panel wherein at least one of the lens arrays is rotated about an axis perpendicular to the liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel.

The '371 patent was filed on July 9, 1992 and issued January 18, 1994. The application as filed is useful in interpreting claim 3. Although the original claims were significantly

narrowed as a result of prior art rejections, the Office Actions and Responses thereto are not relevant to claim construction. *See* Ex. 3.

Defendants request that the Court construe the following claim terms:

- A. A display apparatus
- B. A light source
- C. First and second lens arrays ... for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel
- D. First and second lens arrays ... disposed between said light source and said liquid crystal panel
- E. Wherein at least one of the lens arrays is rotated about an axis perpendicular to the liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel

It is Defendants' understanding that Honeywell will seek construction of the claim terms "comprising" and "lenslets," which in Defendants' opinion need not be construed.

A. The '371 Patent's Description of "A Display Apparatus"

The '371 patent describes the display apparatus as having the following components:

The foregoing and other objects are achieved *in the present invention wherein there is provided a liquid crystal display apparatus comprising a light source, a liquid crystal planar array of pixels for creating an image by controlling the amount of light allowed to pass through each of the pixels, and one or more directional diffuser lens arrays disposed between the light source and the liquid crystal array*

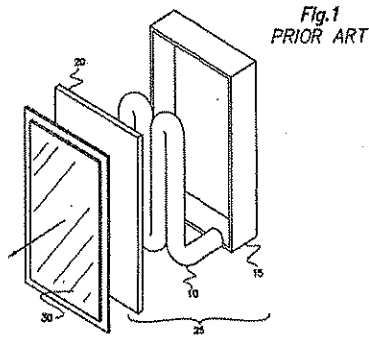
Ex. 1, col. 1, line 62 - col. 2, line 1 (emphasis added).

B. The '371 Patent's Description of "A Light Source"

This limitation is directed to the backlight assembly used to illuminate the LCD panel:

[T]he apparatus of *the present invention* includes the backlight array and liquid crystal of the prior art as shown in FIG. 1

Ex. 1, col. 3, lines 24-26 (emphasis added). Figure 1 is reproduced below:



Referring now to FIG. 1 there is shown a cross section of a typical prior art liquid crystal display apparatus including backlight array 25 comprising lamp 10, rear reflecting surface 15 and lambertian diffuser 20. The backlight array provides a *source of light* which *impinges* on liquid crystal panel 30

Ex. 1, col. 2, lines 46-51 (emphasis added).

C. The '371 Patent's Description of "First and second lens arrays ... for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel"

This claim limitation requires the presence of two lens arrays, which the written description and figures teach as having five specific characteristics:

1. The lens arrays are parallel and horizontally oriented;
2. The lens arrays have pitches (number of lenslets per inch) which are different from each other;
3. The lens arrays face the liquid crystal panel;
4. The lens arrays are separate from the light source; and
5. The predetermined variation in viewing angle is the vertical viewing angle.

1. The lens arrays are parallel and horizontally oriented

The '371 patent teaches that the lens arrays are parallel to each other, and parallel to the horizontal axis of the liquid crystal panel (aside from any "slight misalignment"). Throughout the specification and the figures (Ex. 1, Figs. 4A, 7 and 10 are side views of the structure) the lens arrays are parallel and horizontally oriented:

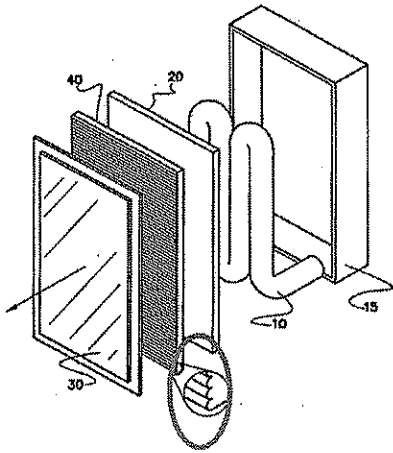


Fig. 2

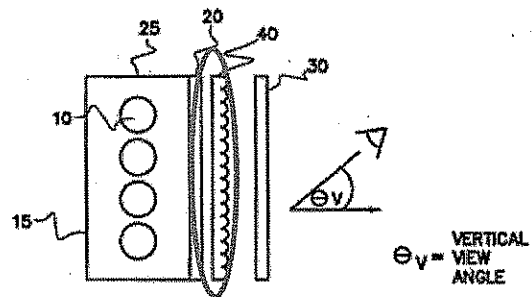


Fig. 4A

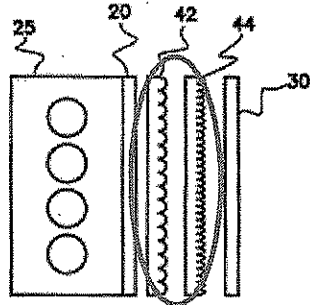


Fig. 7

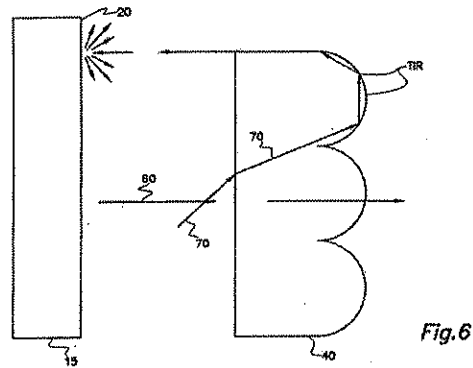


Fig. 6

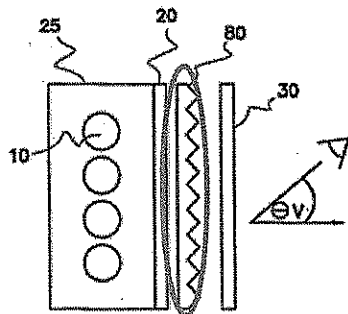


Fig. 10

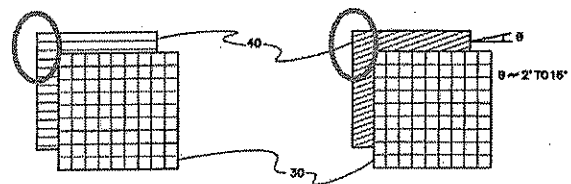


Fig. 12

$\Theta_V =$ VERTICAL VIEW ANGLE

This orientation is necessary to achieve the desired vertical viewing angle. *See* Ex. 1, col. 1, lines 33-39; col. 1, line 62 - col. 2, line 3; col. 2, lines 32-33; col. 3, lines 1-14 and 37-49; col. 4, lines 26 - col. 5, line 15 and lines 21-28; Figs. 5 and 7-12.

2. The lens arrays have pitches which are different from each other

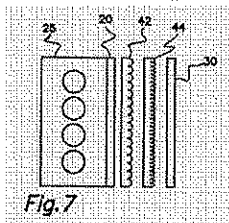
The '371 patent teaches that the two lens arrays must have different pitches from each other in order to avoid moiré. *See* Ex. 1, col. 4 lines 26-39; col. 4, line 59 – col. 5, line 5; Fig. 7.

The '371 patent further teaches a preferred relationship of the different pitches:

In addition, since moire effects result when both of the lens arrays have the same spatial frequency, the rear array 42 should have a coarse resolution or low spatial frequency while the front lens array 44 should have a fine resolution or high spatial frequency. The lens arrays and the panel spatial frequencies should be selected to avoid integral multiples of the other.

Ex. 1, col. 4, lines 59-65.

The '371 patent further depicts this relationship in elements 42 and 44 of Figure 7:

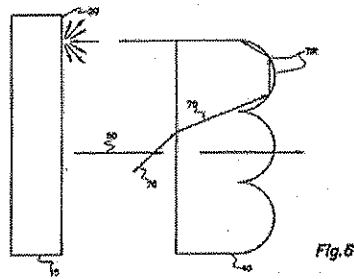


3. The lens arrays face the liquid crystal panel

The only embodiment of the '371 patent teaches the lens arrays facing the liquid crystal panel. In particular, the patent teaches:

The effect which results from the insertion of the cylindrical lens array is explained by reference to FIG. 6 wherein there are shown light rays from the lambertian ... source diffuser impinging on the lens array from various angles.

Ex. 1, col. 3, lines 50 - 54.



See also Ex. 1, Figs. 2, 4A, 7, 10, and 12 reproduced previously.

4. The lens arrays are separate from the light source

The '371 patent teaches insertion of the lens array between the diffuser and the liquid crystal panel.

The apparatus of the present invention includes the backlight array and liquid crystal of the prior art as shown in FIG. 1 with the addition of a lens array 40 inserted between the lambertian diffuser 20 of the prior art and liquid crystal display panel 30, as shown in FIG. 2. It was found that by inserting a directional diffuser consisting of a cylindrical lens array 40 between the lambertian diffuser and the liquid crystal panel that both of the desired effects could be accomplished.

Ex. 1, col. 3, lines 24-32; see also Ex. 1, Figs. 2, 4A, 4B, 6, 7, and 10 all of which teach that the lens arrays are inserted between the diffuser and the liquid crystal panel and are not part of the light source.

5. The predetermined variation in viewing angle is the vertical viewing angle

The Summary of the Invention describes the lens arrays as providing a tailored variation of luminance as a function of vertical viewing angle:

The foregoing and other objects are achieved in the present invention wherein there is provided a liquid crystal display apparatus...for providing a tailored variation of luminance from the liquid crystal display as a function of vertical viewing angle.

Ex. 1, col. 1, line 62 - col. 2, line 3. Indeed, the only written description of the predetermined viewing angle is the vertical viewing angle.

D. First and second lens arrays ... disposed between said light source and said liquid crystal panel

The written description of the '371 patent describes the lens arrays as being inserted between the lambertian diffuser and the liquid crystal panel as discussed above. The patent teaches that an air gap must be present between the diffuser and the lens array:

An air gap must be present at the interface of the lambertian diffuser and the lens array.

Ex. 1, col. 3, lines 55-56.

Figures 4A, 4B, 6, 7, and 10 illustrate this relationship. There is no disclosure of any embodiment where an air gap is not present. The figures in the original patent application, in particular Figure 6, specifically identified the air gap:²

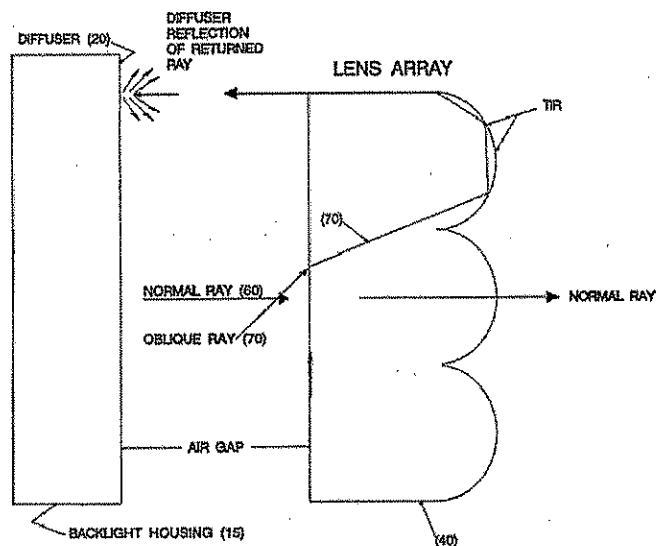


FIGURE 6

² Ex. 3 at 44.

E. Wherein at least one of the lens arrays is rotated about an axis perpendicular to the liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel

The only written description of “rotated” is the rotation by a “few degrees (Typically 2 to 16 degrees) from the horizontal axis”:

This residual moire can be removed by rotating the lens array 40 with the respect to the LCD array 30, as illustrated in FIG. 12. This rotation of the lens array by a few degrees (Typically 2 to 16 degrees) from the horizontal axis causes a small change in the effective spatial frequency difference of the two arrays and thereby eliminates the residual moire.

Ex. 1, col. 5, lines 21-28.

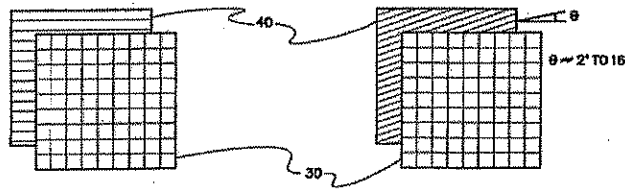


Fig.12

Both the degree of rotation and the axis from which it is measured are confirmed by Figure 12.

V. ARGUMENT

A. Legal Standards

This Court is familiar with the legal principles of claim construction and thus we omit a general exposition of the law of claim construction. See *Cephalon, Inc v. Barr Labs, Inc.*, 389 F. Supp. 2d 602 (D. Del. 2005); *L.G. Philips LCD Co. v. Tatung Co.*, 434 F. Supp. 2d 292 (D. Del. 2006); *Affymetrix, Inc. v. Illumina, Inc.*, 446 F. Supp. 2d 277 (D. Del. 2006); *Nice Systems, Inc. v. Witness Systems, Inc.*, 528 F. Supp. 2d 470 (D. Del. 2007). In particular, this Court has noted that “the preferred approach to claim construction is to focus ‘at the outset on how the patentee used the claim term in the claims, specification and prosecution history’” *Cephalon*, 389 F. Supp. 2d at 605. In *Cephalon*, the Court noted in particular “the consistent use of a claim term

by an inventor in the specification may serve to limit the scope of a claim.” *Id.* at 606. Claim construction does not stand alone, in the abstract, but rather is a vehicle to determine an underlying judgment of infringement or non-infringement. *Wilson Sporting Goods Co. v. Hillerich & Bradsby Co.*, 442 F.3d 1322, 1326 (Fed. Cir. 2006) (“knowledge of ... [accused] product or process provides meaningful context for ... claim construction.”)

B. Construction of the Disputed Claim Terms

1. Construction of “A display apparatus”

This term should be interpreted to mean a liquid crystal display (LCD) module, i.e., the light source, lens arrays and liquid crystal panel. The ‘371 patent Summary of the Invention characterizes the invention as a “liquid crystal display apparatus” having these components:

The foregoing and other objects are achieved *in the present invention wherein there is provided a liquid crystal display apparatus* comprising a light source, a liquid crystal planar array of pixels for creating an image by controlling the amount of light allowed to pass through each of the pixels, and one or more directional diffuser lens arrays disposed between the light source and the liquid crystal array

Ex. 1, col. 1, line 62 - col. 2, line 1 (emphasis added). Where the patent describes the invention, as opposed to a mere embodiment, the description defines the scope of the claim. *See, e.g., Cephalon*, 389 F. Supp. 2d at 606; *see also Verizon Services Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308 (Fed. Cir. 2007). Additionally, “when the scope of the invention is clearly stated in the specification, and is described as the advantage and distinction of the invention, it is not necessary to disavow explicitly a different scope.” *On-Demand Machine Corp., v. Ingram Indus, Inc.*, 442 F.3d 1331, 1340 (Fed. Cir. 2006).

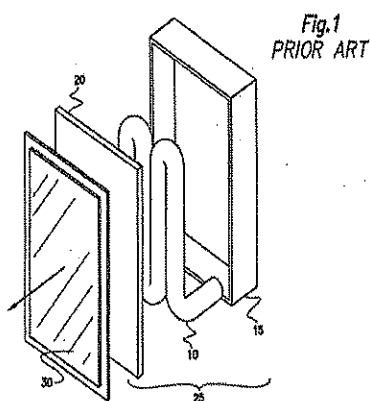
Nothing in the ‘371 patent requires a further limiting of the construction of “a display apparatus,” as proffered by Honeywell.

2. Construction of “a light source”

This term should be interpreted to mean a source of distributed light. The invention, not simply an embodiment, includes backlight array 25 of the prior art for providing the “source of light.”

[T]he apparatus of *the present invention* includes the backlight array and liquid crystal of the prior art as shown in FIG. 1

Ex. 1, col. 3, lines 24-26 (emphasis added). Figure 1 is reproduced below:



The backlight array 25 of the invention comprises “lamp 10, rear reflector 15, and lambertian diffuser 20” and “provides a *source of light* which *impinges* on liquid crystal panel 30” Ex. 1, col. 2, lines 46-51 (emphasis added). Thus, the backlight array does not provide a point source that illuminates a portion of the panel, but rather distributes light to cover the entire area of the panel. Such distributed light source is required for the display to operate. Liquid crystal panels do not generate light; they merely block or allow light to pass through. For the liquid crystal panel to function, light must be applied to the liquid crystal panel. Schlam Dec., ¶ 14. From consideration of all the structures shown in the ‘371 patent it is apparent that the light from the light source must be distributed across the surface of the liquid crystal panel to function. See Ex. 1, Figs. 2, 4A, 4B, 7, and 10.

In the structures shown and described in the ‘371 patent, the light source achieves this distribution of light by use of lambertian diffuser 20. However, a lambertian diffuser *per se* is

not part of the definition of “light source” since a person of ordinary skill in the art would know that a distributed source of light could be achieved in other ways, for example, by use of a side or edge-lit light guide. *See* Schlam Dec., ¶¶ 14, 15, 21.

Honeywell’s proposed construction broadly defines the light source to require just a lamp, so that it can consider structure on light guides in side-lit displays to be a lens array. By arguing that the light guide is a lens array, not part of the light source, Honeywell seeks to capture Defendant Fuji’s side-lit display modules having only a single lens array. Schlam Dec., Exs. 5, 7, ¶¶ 27-31, 37-40. Honeywell’s argument ignores the technical reality that a lamp or light emitting diode (LED) in a side or edge-lit backlight cannot, without the light guide, illuminate the surface of the liquid crystal panel. Schlam Dec., ¶ 14.

3. Construction of “first and second lens arrays, each having a plurality of individual lenslets ... for providing a predetermined variation with viewing angle of light transmission from said light source through said lens arrays and said liquid crystal panel”

This phrase should be interpreted to mean two lens arrays: (1) parallel to each other, and parallel to the horizontal axis of the liquid crystal panel (aside from any “slight misalignment”); (2) having different pitches from each other; (3) facing toward the liquid crystal panel; (4) separate from the light source and having a plurality of lenslets; and (5) providing a variation of light transmission with vertical viewing angle.³

a. Tailoring Luminance with Vertical Viewing Angle Requires Parallel Horizontally Oriented Lens Arrays

The ‘371 patent always describes the ‘371 patent as having parallel, horizontally oriented lens arrays. *See* Ex. 1, Figs. 2, 4A, 4B, 6, 7, 10 and 12. Indeed Honeywell’s own expert, Mr. Dennis Wilwerding, understood the specification to teach:

³ The ‘371 patent also requires that the pitch of the lens arrays be different from the pitch of the LCD panel. Ex. 1, col. 4, line 63 - col. 5, line 5. However, since this is not dispositive of any issue in the case, Defendants are not pursuing this construction.

In the particular application described in the patent's specification, the inventors were trying to provide a high display brightness over a *wide horizontal viewing angle* and a *narrow vertical viewing angle* and placed *both lenticular arrays in generally the same axis*.

Ex. 4 at 6 (emphasis added). The only application (or embodiment) described in the patent's specification is designed to maintain a wide horizontal viewing angle and a narrow vertical viewing angle. This design is not simply *an* embodiment of the '371 patent, it is the *only* embodiment. Nowhere in the claims, the specification, or the prosecution history do the inventors ever discuss the possibility of any other lens array orientations or viewing angles. *On Demand*, 443 F.3d at 1340 ("The role of the specification is to describe and enable the invention. In turn, the claims cannot be of broader scope than the invention that is set forth in the specification."); *see also Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473, 1479 (Fed. Cir. 1998); *cf., Cephalon*, 389 F. Supp. 2d at 606.

Mr. Wilwerding's statement is consistent with the intrinsic evidence and reflects how one of ordinary skill in the art would understand the teachings in the specification. The specification dictates that this orientation is necessary to achieve the desired horizontal and vertical viewing angles. *See* Ex. 1, col. 1, lines 33-39; col. 1, line 62 - col. 2, line 3; col. 2, lines 32-33; col. 3, lines 1-14 and 37-49; col. 4, lines 26 - col. 5, line 15, and lines 21-28; Figs. 5 and 7-12. Schlamm Dec., ¶ 18.

Since the objectives for the use of the second lens array are to further constrict the vertical viewing angle and to avoid moiré, the first and second lens arrays of claim 3 must be parallel as shown in Figure 7 and as discussed in the patent:

The combination of the dual lenses increased the desired reduction in luminance with increased viewing angle, and in addition reduced or eliminated the moire patterns with the selection of an appropriate pitch, or number of lenses per inch, for the two lenses in question.

Ex. 1, col. 4, lines 29-34. The increased luminance and constricted vertical viewing angle are illustrated in Figures 5 (single lens array) and 8 (dual lens arrays), reproduced *infra* at p. 20. Neither effect would be achieved if the lens arrays were not substantially parallel. Schlam Dec., ¶ 18.

This limitation is important since none of the Defendants' accused products have two parallel, horizontally oriented lens arrays. *See, e.g.*, Schlam Dec., Exs. 5, 6, 8, ¶¶ 32-36, 41-43.

b. The '371 Patent Teaches Lens Arrays Having Different Pitch and Disclaims and Disavows Two Lens Arrays Having the Same Pitch

The '371 patent teaches that the first and second lens arrays must have different pitches from each other. Ex. 1, col. 4, lines 26-45; col. 4, line 59 - col. 5, line 5; Fig. 7. The '371 patent introduces the second lens array, in part, to break-up moiré interference caused by the interaction between the first lens array and the LCD panel. Ex. 1, col. 4, lines 26-34. To accomplish this goal, the second lens array must have different pitch from the first lens array. *Id.* This pitch difference is shown in Figure 7, the only figure to depict the claimed two lens array embodiment.⁴

Not only does the '371 patent state that the two lens arrays have different pitch, it also affirmatively warns against using two lens arrays having the same pitch, stating "moiré effects result when both of the lens arrays have the same spatial frequency" (i.e., pitch). Ex. 1, col. 4, lines 59-60. This is a disavowal or exclusion of any two lens array configuration where both lens arrays have the same pitch. This disavowal precludes a construction permitting the use of lens arrays having the same pitch. *Scimed Life Systems Inc. v. Advanced Cardiovascular Systems Inc.*, 242 F.3d 1337, 1341 (Fed. Cir. 2001); *Inpro II Licensing, S.A.R.L. v. T-Mobile, USA, Inc.*,

⁴ In response to the Examiner's rejection of the claims as originally filed, claims encompassing a single lens array were cancelled leaving only claims requiring two lens arrays and moiré reducing structures. Ex. 3, pp. 58-61.

450 F.3d 1350, 1355-57 (Fed. Cir. 2006) (patent specification disparaged serial interfaces and the phrase “host interface” was limited to a “parallel bus interface”); *Honeywell International, Inc. v ITT Industries, Inc.*, 452 F.3d 1312, 1319-1320 (Fed. Cir. 2006) (“[B]ased on the disclosure in the written description, which demeaned the properties of carbon fibers, we conclude that the patentee thereby disavowed carbon fibers from the scope of the '879 patent's claims.... If the written description could talk, it would say, ‘Do not use carbon fibers.’”).

These teachings also indicate the lens arrays must be interpreted as being parallel to each other. If the lens arrays were not parallel to each other, then changing the pitch would not have any effect on moiré since they could not cooperate together to eliminate the moiré pattern. *See* Ex. 1, col. 4, lines 26-45; Schlam Dec., ¶ 18.

The pitch limitation is important since most of the Defendants’ accused products have two lens arrays having the same pitch. *See, e.g.*, Schlam Dec., ¶¶ 35, 43.

c. The ‘371 Patent Requires Lens Arrays Facing the Liquid Crystal Panel

The only embodiment disclosed in the ‘371 patent requires that the lenslets of the lens arrays face the liquid crystal panel. *See* Ex. 1, Figs. 2, 4A, 4B, 6, 7, and 10. The object of the invention was to “provide a higher concentration of light energy, and therefore increased luminance, within a particular range of viewing angles.” Ex. 1, col. 1, lines 57-59. The luminance curves in Figures 5, 8, 9, and 11 reflect this increased luminance where on-axis (*i.e.*, at 0 degrees) luminance gain of about 20% or more is reported when lens arrays are used as compared with the diffuser alone. This increased on-axis luminance is also called “gain.” The gain is achieved as a result of total internal reflection (TIR) of off-axis light as shown in Figure 6. This TIR is effective in increasing on-axis luminance intensity only if the lens array faces the LCD panel. *See* Ex. 1, col. 3, line 50 - col. 4, line 16. This result is not achieved if the lenslets face towards the light source. Schlam Dec., ¶¶ 11, 18, 46-48.

As the inventors reported in an article published in October, 1992 that a lens array facing the light source would not provide the required gain:

[A]nother useful configuration results from *flipping the lens array over* such that the curved lens surface faces the diffuser. In this case, light exiting the diffuser impinges on the convex curvature of the lens array first. This results in preferentially directing light away from the normal to the plane of the lens array and into oblique angles. In other words, *this configuration throws light into off-axis angles at the expense of on-axis luminance and can aid in cases where display brightness suffers off-axis. This configuration has an on-axis gain slightly less than one.*

Ex. 5 at 260 (emphasis added). In other words, flipping the lens array decreased the on-axis display brightness. This decrease is reflected by the on-axis gain of less than one, *i.e.*, the percentage of luminance on-axis was less than 100% as compared to when no lens array was used. Thus, the use of two lens arrays facing the light source would destroy one objective of the '371 patent - to obtain increased on-axis luminance. Schlam Dec., ¶¶ 18, 47. It would be improper to interpret these claims to include structures which would not permit one to obtain a stated objective of the patent.

The interpretation of this limitation will affect whether a potential on-sale bar exists and Honeywell's ability to assert an earlier date of invention to potentially avoid prior art. *See* Schlam Dec., ¶¶ 44-46. *Modine Mfg. Co. v. United States Int'l Trade Comm'n*, 75 F.3d 1545, 1556 (Fed. Cir. 1996) ("When claims are amenable to more than one construction, they should when reasonably possible be interpreted so as to preserve their validity").

d. Each Lens Array Must Consist of a Member Separate From the Light Source

The only embodiment disclosed in the '371 patent utilizes a light source which is separate from the lens arrays. *See* Ex. 1, Figs. 2, 4A, 4B, 6, 7, and 10. The "first and second lens arrays" are recited as separate claimed elements from the "light source," consistent with being pictured and described in the figures and specification as separate elements.

Neither the claims nor the specification and figures of the '371 patent teach or suggest any other construction. The specification of the '371 patent consistently defines the lens arrays as being separate from the light source. Thus, and most significantly, the Summary of the Invention states that:

The foregoing and other objects are achieved in the present invention wherein there is provided ... one or more directional diffuser lens arrays disposed *between the light source and the liquid crystal array*

Ex. 1, col. 1, line 62 – col. 2, line 1 (emphasis added). The patent further states:

The apparatus of the present invention includes the backlight array and liquid crystal of the prior art as shown in FIG. 1 with the addition of a lens array 40 inserted between the lambertian diffuser 20 of the prior art and liquid crystal display panel 30, as shown in FIG. 2. It was found that by inserting a directional diffuser consisting of a cylindrical lens array 40 *between the lambertian diffuser and the liquid crystal panel* that both of the desired effects could be accomplished.

Ex. 1, col. 3, lines 24-32 (emphasis added). The lens arrays are repeatedly described as being “inserted” between diffuser 20 and liquid crystal panel 30. *See, e.g.*, Ex. 1, col. 3, lines 24-52. It is impossible for a lens array to be disposed between the liquid crystal panel and the light source if the light source is the lens array.

The significance of this aspect of the Defendants’ construction of the first and second lens arrays limitation is that Honeywell has accused Fuji’s liquid crystal modules with only a single lens sheet (lens array) of infringement. *See* Schlam Dec., Exs. 5, 7, ¶¶ 27-31, 37-46.

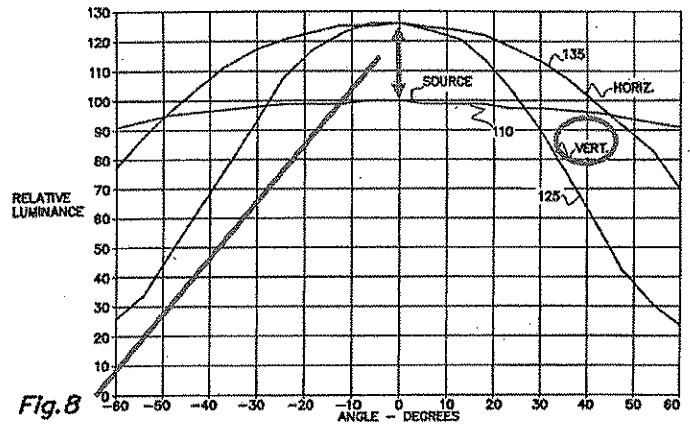
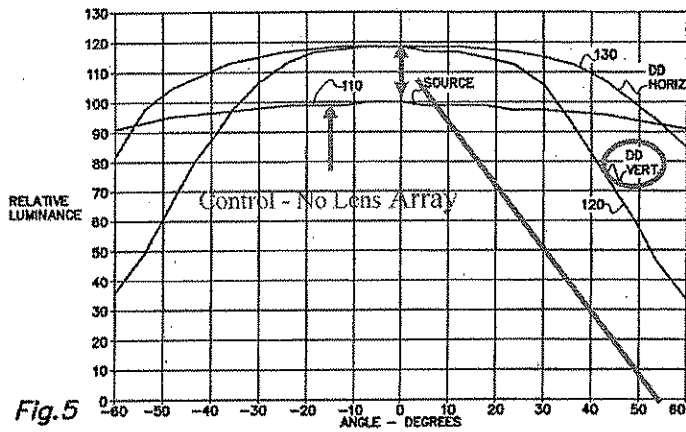
e. Predetermination Variation of Light Transmission with Viewing Angle Refers to a Predetermined Variation with Vertical Viewing Angle

In the Summary of the Invention the patent states that the objects “*in the present invention*” are accomplished by providing a light source, a liquid crystal panel, and lens arrays

“for providing a tailored variation of luminance from the liquid crystal display as a function of *vertical* viewing angle.” Ex. 1, col. 1, line 62 - col. 2, line 3 (emphasis added). The ‘371 patent also focuses on vertical viewing angle by contrasting the invention with “prior art displays which exhibit a relatively wide variation of light transmission with viewing angle, especially the *vertical* viewing angle.” Ex. 1, col. 2, lines 62-65 (emphasis added). Similarly, in describing the increase in brightness that occurs when a lens array is inserted between the backlight and liquid crystal panel, the patent explains that “the desired decrease in luminance with increased *vertical* viewing angle is obtained” Col. 3, lines 37-42 (emphasis added). In other words, when a lens array was inserted, it had the desired effect of decreasing luminance at increased vertical angles and increasing luminance at the shallower vertical angles of interest. The luminance curves of Figures 5, 8, 9, and 11 (reproduced subsequently) are consistent, showing a substantial drop-off in luminance with vertical viewing angle as compared to horizontal viewing angle. The ‘371 patent describes the phenomenon:

In general it was discovered that the addition of additional lens arrays caused *a steeper or more rapid variation of the change in luminance with vertical viewing angle, which was desirable*, but the corresponding change in luminance with variations in horizontal [sic] viewing angle also became steeper, which was not desirable for the particular application in question. For the particular application in question the preferred embodiment included two lens arrays in series which provided the best tradeoff of decrease in luminance with variation of vertical viewing angle, while not adversely affecting the variation in luminance with horizontal [sic] viewing angle.

Ex. 1, col. 4, lines 46-58 (emphasis added). This is illustrated in the figures reproduced below:



Maximum Luminance Gain On-Axis

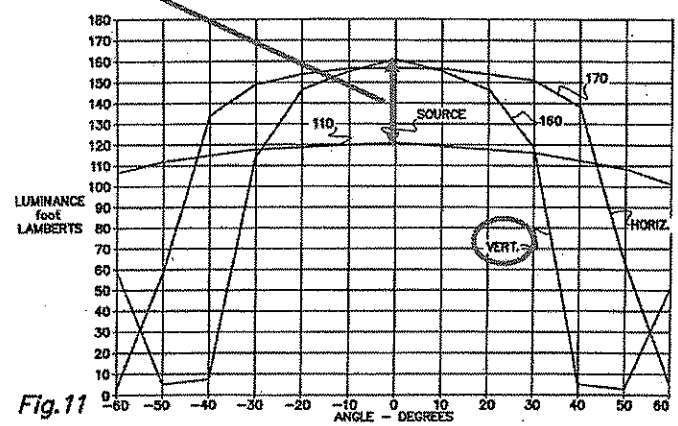
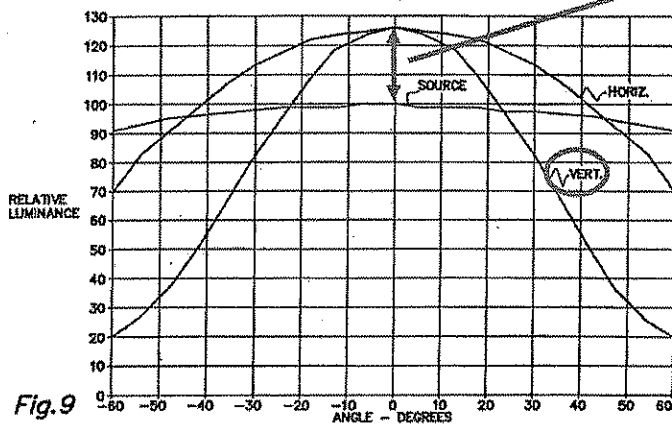


FIG. 8 illustrates again the relatively flat response of the lambertian source diffuser along curve 110, and the increased roll off with vertical viewing angle of curve 125 as well as the corresponding variation of luminance with horizontal [sic] viewing angle as illustrated by curve 135 for the dual lens array of FIG. 8.

Ex. 1, col. 4, lines 39-45; *see also*, col. 3, lines 38-49; col. 5, lines 6-15. Thus, the predetermined viewing angle must be interpreted as being only the vertical viewing angle in which there is a predetermined variation. This is further confirmation that the sole embodiment disclosed in the '371 patent uses horizontally disposed lens arrays.

The repeated emphasis on vertical viewing angle cannot be ignored. *See SafeTCare Mfg. Inc. v. Tele-Made Inc.*, 497 F.3d 1262, 1269 (Fed. Cir. 2007) (noting that claims limited due to statements made in specification, where “[i]n this case, despite the fact that Claim 12 makes no mention of actuators or lift dogs, the patentee repeatedly emphasized its invention as applying pushing forces as opposed to pulling forces against the lift dogs.”); *On Demand*, 442 F.3d at 1340. (“[T]he focus of the Ross patent is immediate single-copy printing and binding initiated by the customer and conducted at the customer's site. The district court's definition of ‘customer’ cannot eliminate these constraints in order to embrace the remote large-scale production of books for publishers and retailers.”).

This limitation is important because it is further evidence that the lens arrays can only be horizontally arranged and excludes arrangements where the lens arrays are crossed at 90 degrees to one another, as is the design in most of Defendants’ accused products.

4. Construction of “first and second lens arrays . . . disposed between said light source and said liquid crystal panel”

The phrase “disposed between said light source and said liquid crystal panel” should be interpreted to require that the first and second lens arrays be positioned between the light source and the liquid crystal panel, with a purposeful and defined air gap at the interface of the light source and the lens array closest to the light source.

The ‘371 patent unequivocally states that an air gap must be present.

An air gap *must* be present at the interface of the lambertian diffuser and the lens array.

Ex. 1, col. 3, lines 55-56 (emphasis added). Such an absolute statement defines the scope of the invention, not merely an embodiment. *TiVo v. Echostar Communications Corp.*, 516 F. 3d 1290, 1300-01 (Fed. Cir. 2008) (holding that when the specification describes a feature that “must” be included, it is indicative of the invention); *Verizon Services Corp. v. Vonage Holdings Corp.*,

503 F.3d 1295, 1308 (Fed. Cir. 2007) (“Where the specification makes clear that the invention does not include a particular feature, that feature is deemed to be outside the reach of the claims of the patent, even though the language of the claims, read without reference to the specification might be considered broad enough to encompass the feature in question.”).

In addition to this unequivocal statement, the specification teaches TIR is fundamental to the enhanced brightness and claimed variation with viewing angle, and the air gap is fundamental to TIR. The air gap ensures that light rays are refracted to the extent desired by the ‘371 patent when they leave the lambertian diffuser 20, travel through the air gap, and enter the lens array 40, as illustrated by ray 70 in Figure 6. That the air gap is purposeful and defined is confirmed by Figure 6 as originally filed with the application (Ex. 3 at 44), which labeled the space between the surface of the lambertian diffuser 20 and lens array 40 as an “AIR GAP.”

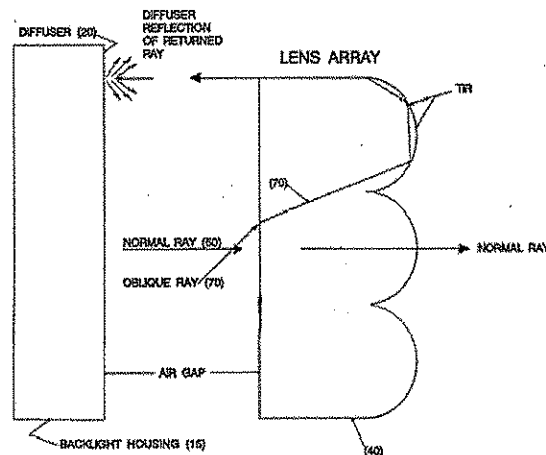


FIGURE 6

An “air gap” has been described as “fundamental.” Schlam Dec., ¶ 49.

The significance of the construction of this limitation rests in the fact that the accused LCD modules of Defendants have their components stacked one upon another without a spacer, and therefore, the required purposeful and defined gap between the light source diffuser and the closest lens array is not found. *See, e.g.*, Schlam Dec., ¶ 25.

5. Construction of “wherein at least one of the lens arrays is rotated about an axis perpendicular to the liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel.”

The term “wherein at least one of said first and second lens arrays is rotated about an axis perpendicular to said liquid crystal panel in order to provide a slight misalignment between said lenslets and said liquid crystal panel” (hereinafter referred to as “slight misalignment”) should be construed to mean that “one or more of the lens arrays is intentionally rotated at an angle of not less than 2 degrees and not more than 16 degrees in relation to the horizontal axis of the liquid crystal panel.”

The ordinary meaning of the claim language (“slight misalignment”) supports limiting this term to small rotations. Indeed, the inventors did not choose to claim merely “a misalignment,” which might have supported a larger range if the range were not also limited by the specification. Even Honeywell’s expert agreed that the ordinary meaning of “slight” is “small of its kind or in amount.” Ex. 6. at 387:5–18. Lewin testified with respect to the definition in the Merriam Webster On Line Dictionary, accessed on March 4, 2008. *Id.*, Ex. 7. Dr. Lewin acknowledged the definition had not changed in the period 1989 to March 4, 2008. Ex. 6 at 387:19-22. Further, claim 3 states that the lens arrays are “rotated . . . *in order to provide a slight misalignment*” (emphasis added), which requires that the rotation be done intentionally, not by accident.

The ‘371 patent specification expressly identifies the particular rotations that are “slight” and identifies the point of reference for measuring those rotations. The specification dictates that “slight misalignment” in the context of the patent refers to rotations of a few degrees with respect to the horizontal axis, and, more specifically, two to sixteen degrees when it states:

This residual moire can be removed by *rotating the lens array 40 with the respect to the LCD array 30*, as illustrated in FIG. 12. This rotation of the lens array *by a few degrees (Typically 2 to 16 degrees) from the horizontal axis* causes a small change in the effective spatial frequency difference of the two arrays and thereby eliminates the residual moiré.

Ex. 1, col. 5, lines 21–28 (emphasis added). Thus, the specification describes the rotation as being small or “a few degrees” consistent with claim 3’s use of “slight.” This portion of the specification also describes the misalignment as being measured with respect to the horizontal axis, not the vertical axis or a diagonal, non-cardinal axis. The latter is confirmed by Figure 12 as originally filed (Ex. 3 at 50) (Figure 12 in the issued ‘371 patent omits the legends), which depicts rotation of two to sixteen degrees *with respect to the horizontal axis*:

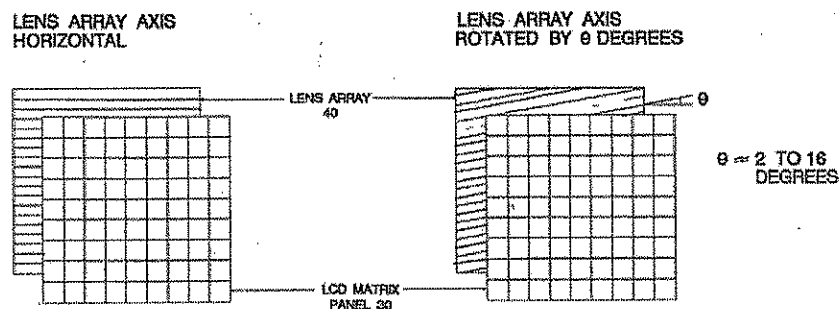


FIGURE 12

The specification describes Figure 12 as showing “the angular rotation of the lens array with respect to the LCD matrix array to eliminate residual moiré effects.” Ex. 1, col. 2, lines 40–42. Similarly, claim 3 describes the “slight misalignment” as being measured with respect to the “liquid crystal panel.” Therefore, Figure 12, together with the previously quoted specification text and claim language, demonstrates that the limitation “slight misalignment” in the context of the ‘371 patent refers only to intentional rotations of 2–16 degrees with respect to the horizontal axis. The specification contains no description of any other degree of rotation, any other point of reference, or the possibility of unintentional rotations. The “axis perpendicular to the liquid crystal panel” in the claim “refers to a hypothetical axis projecting from the surface of the liquid crystal panel about which the “slight” rotation takes place.

This limitation is further evidence that the lens arrays can only be horizontally oriented and excludes arrangements where the lens arrays are crossed at 90 degrees to one another.

Further, this excludes from the scope of the claims many of Fuji's and Samsung SDI's products and excludes all of Optrex's and many of Samsung SDI's redesigned products which have not been accused of infringement. *See, e.g., Schlam Dec., Exs. 5-7, ¶¶ 27-40.*

VI. CONCLUSION

For the reasons set forth above, Defendants respectfully request that the Court construe the disputed terms as proposed by Defendants.

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IN THE UNITED STATES DISTRICT COURT
DISTRICT OF DELAWARE

CERTIFICATE OF SERVICE

I, Philip A. Rovner, hereby certify that, on May 2, 2008, the within document was electronically filed with the Clerk of the Court using CM-ECF which will send notification of such filing to the following; that the document was served on the following counsel as indicated; and the document is available for viewing and downloading from CM-ECF:

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